WORLD DEMAND FOR SHRIMP & PRAWNS MAY OUTSTRIP SUPPLY DURING NEXT DECADE

Donald P. Cleary

Rising incomes in the United States have been an import determinant of sharp increases in the demand for shrimp. This same force--and associated improvements in distribution and use of frozen foods--is now creating a greater demand for shrimp throughout the world. The U.S. will have to compete increasingly with other countries for limited shrimp and prawn resources. Assuming demand in other countries increases at least as rapidly as U.S. demand, the world's estimated harvest potential of shrimp and prawns from known populations may be reached by 1980.

Rapid Growth in U.S. Shrimp Consumption

Since 1950, shrimp consumption in the United States has increased nearly 6% annually, on the average; it rose from 118.3 million pounds (heads-off weight) to 336.8 million pounds in 1968. On a per-capita basis, shrimp consumption increased from .78 pound to 1.68 pounds in that period. This is more than a 115% gain. In comparison, during 1950-1968, per-capita consumption of meat, poultry, and fish combined increased 19%--from 177 pounds to 210 pounds retail weight. Similarly, shrimp gained in popularity while per-capita consumption of all seafoods has remained relatively constant at 10 to 11 pounds.

Determinants of Shrimp Consumption

Past increases in the consumption of shrimp in the U.S. have been quite spectacular. What does the future hold? The answer to this question lies in an understanding of the determinants of shrimp consumption and how those determinants influence the level of consumption. Major determinants are price of shrimp relative to the general price level for consumer goods, price of competing foods, and income levels.

Statistical techniques make it possible to isolate and measure with some degree of precision the importance of these determinants of shrimp consumption. An application of these techniques indicates that income and price of shrimp are very influential determinants. These two factors, according to the analysis, accounted for 90% of the change in per-capita consumption since 1950. In the analysis, per-capita consumption was expressed as a mathematical function of per-capita personal disposable income and the retail price of shrimp adjusted by the consumer price index. Two important observations can be made from this equation:

(1) Each 1% gain in per-capita real income tends to be accompanied by a 1.77% increase in per-capita shrimp consumption.

(2) Each 1% increase (relative to general price level) in the retail price of shrimp tends to be accompanied by a 0.46% decline in per-capita consumption.

Knowing these relationships, we can predict with some reliability what consumption is likely to be--given changes in income and in price of shrimp.

Figure 1 shows actual per-capita shrimp consumption and estimated consumption for the period. Note how closely the equation is able to estimate per-capita consumption when price and income are known.

The author is an Industry Economist, Division of Economic Research, BCF, 7338 Baltimore Ave., College Park, Maryland 20740.

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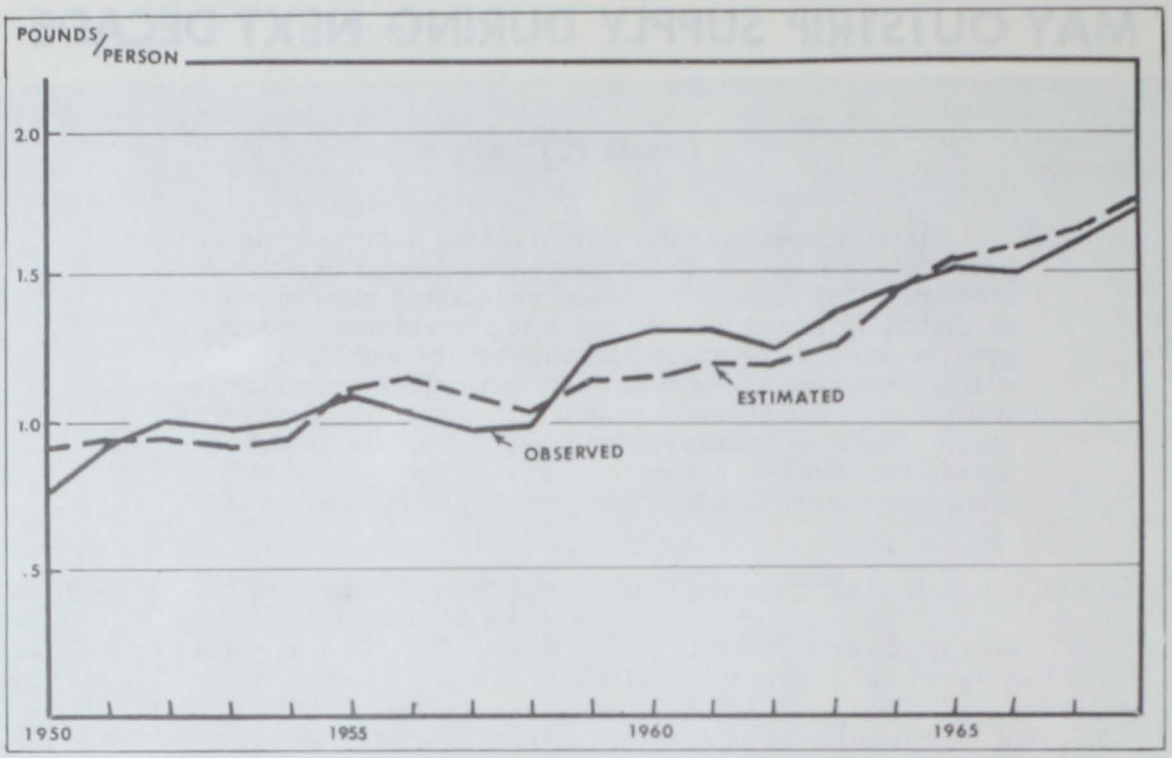

Fig. 1 - Actual and estimated per-capita shrimp consumption, 1950-1968.

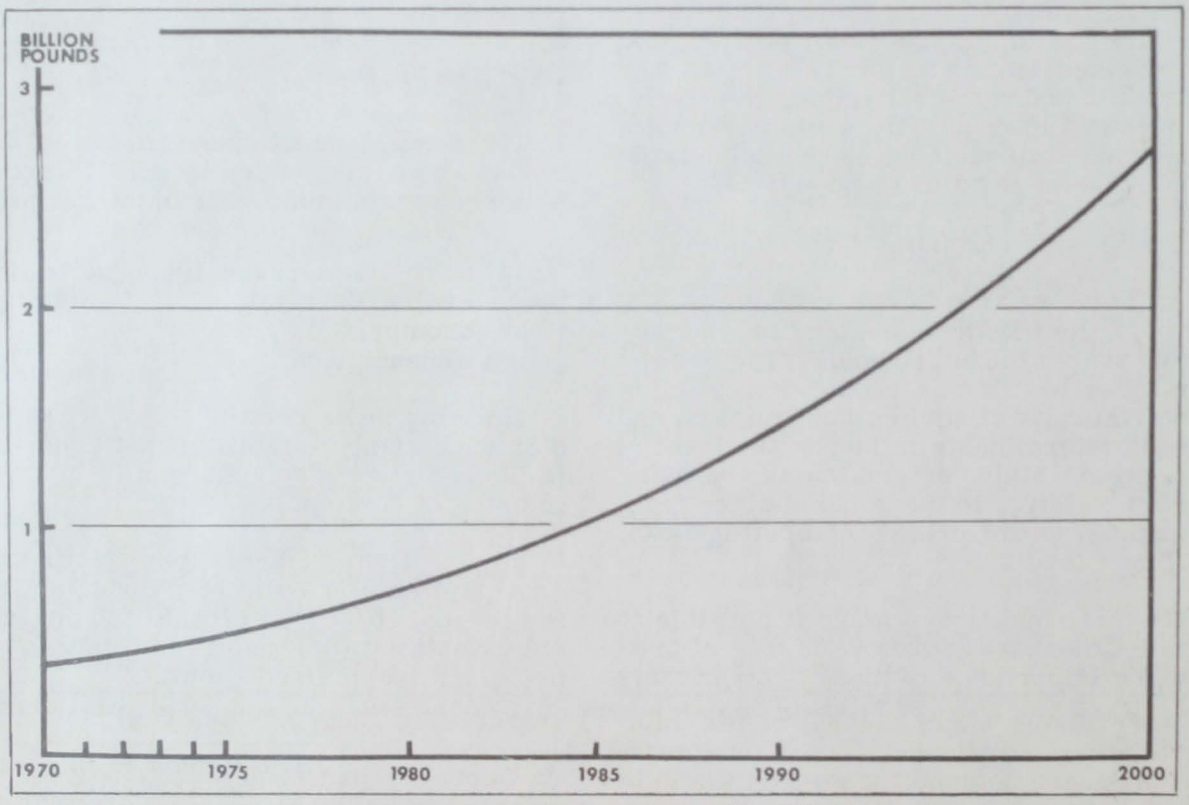

Fig. 2 - Projected total U.S. consumption of shrimp, 1970-2000 (heads-off weight).

During 1950 through 1968, "real" per-capita personal disposable income (adjusted for changes in general price level as measured by consumer price index) has risen relatively faster than retail shrimp prices; thus the rapid increase in per-capita consumption. Increases in the "real" price of shrimp have been moderated by world ability to develop new shrimp fisheries and to increase exports of shrimp to the United States. In 1950, shrimp imports were only 40% of domestic landings; by 1968, imports were 17% greater than total domestic landings.

World Demand for Shrimp and Prawns May Outstrip Supply by 1980

Using the consumption equation explained above, per-capita shrimp consumption was projected into the future by assuming 2 things: 1) "real" price of shrimp will not increase, and 2) a series of changes in income will occur as projected by the National Planning Association. Projected total consumption of shrimp in the United States is shown through the year 2000 in figure 2.

Based on the results of the analysis, per-capita shrimp consumption in the United States could reach 2.56 pounds, heads-off weight, by 1975, and 3.39 pounds by 1980. If we assume the world supply of shrimp is essentially unlimited--and if we can assume no change in past relation between income and demand for shrimp--then the analysis indicates that per-capita consumption would reach 5.30 pounds by 1990, and 8.80 pounds by 2000. Estimated per-capita consumption, multiplied by Census Bureau projected population, shows total U.S. consumption of shrimp can be expected to reach 562 million pounds (heads-off weight) in 1975, 797 million pounds in 1980 and, if supply is unlimited, 1.4 billion pounds in 1990, and 2.7 billion pounds in 2000.

It is a risky business to make projections far into the future on the basis of past and current relationships. Whereas per-capita real income most likely will continue to increase over the next 30 years, demand for shrimp may reach a saturation point. Even if supplies were sufficient to satisfy demand at a constant price, there is a probability that consumer tastes would change, or the influence of income and other forces on demand will change, and demand for shrimp would be altered.

As noted, much of the increase in per-capita consumption of shrimp in the U.S. can be associated with increasing affluence. Another factor has been advancement in the distribution and marketing system. Western Europe and Japan are experiencing rapidly increasing demands for shrimp for much the same reason as the U.S. And, similarly, these markets are supplying their increasing needs from imports. It is very likely that growth in world demand will grow more rapidly than expansion of shrimp and prawn harvesting.

A maximum estimate is that the world harvest of shrimp and prawns can be expected to increase only 88%. Such an estimate is based on known natural stocks and does not include the still-undetermined potential from aquaculture. Total world harvest potential is estimated to be 1.9 billion pounds, heads off. Estimated present world production of shrimp and prawns is slightly more than one billion pounds. This figure is an average for the mid-1960s, thus will understate present total world harvest.

United States consumption of shrimp in 1968 was 337 million pounds, or about one-third total world shrimp and prawn production. If the U.S. continues to consume one-third of world harvest, and if U.S. consumption increases as anticipated, then total world production must reach maximum potential of 1.9 billion pounds by late 1970s.

Excess Demand Will Be Moderated By Price Increases

Real personal disposable income is expected to increase at about 3% per year during the 1970s and 1980s. Since per-capita consumption increases 1.77 times as fast as per-capita personal disposable income, we can anticipate an increase in per-capita demand of over 5% per year. Also, population is expected to increase slightly more than 1% per year through the 1970s and 1980s. The combined effect of increasing real income and increasing population should result in a 6-7% growth per year in total demand. To offset increasing demand--and to hold total consumption constant after maximum harvest potential is reached--real price will have to increase by about 15% per year.

Certainly price increases will be strong when production is no longer able to keep

pace with increases in demand. Price increases should be expected to accelerate considerably before potential harvest is realized. With current technology, and at current prices, not all the world's shrimp resources will be profitable to harvest. Only with increasing prices will there be sufficient stimulus to develop new grounds and to harvest high-cost areas.

The possibility of shrimp and prawn harvests leveling off in the next decade while demand continues to climb is quite real. Shortages in natural supplies will force increasing attention to aquaculture. As prices increase, the development and use of higher cost methods will be stimulated. This illustrates the importance of considering future returns to aquaculture in planning development of U.S. and world estuarine areas.

"Clean" catch consisting predominantly of pink shrimp.